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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/913,821	01/02/2002	George Paul Yiasemides	814/15	4477

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EXAMINER

HECKENBERG JR, DONALD H

ART UNIT

PAPER NUMBER

1722

DATE MAILED: 12/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/913,821	<b>Applicant(s)</b> YIASEMIDES ET AL.	
	<b>Examiner</b> Donald Heckenberg	<b>Art Unit</b> 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on the amendment filed on September 9, 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-90 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 65-90 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-21, 23-47, 52-54 and 56-64 is/are rejected.
- 7) ☒ Claim(s) 12, 22, 48-51, 55 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All    b) ☐ Some \*    c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                           | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) = . | 6) <input type="checkbox"/> Other:  |

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1. The restriction requirement of the previous Office Action has been withdrawn because upon further examination, the general inventive concept reasoning used for distinction between the groups is not correct. An action on the merits of all pending claims follows.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the formations provided on the facing parts that increase surface area, including serrations, grooves, or fins, as recited in claims 32-34, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The following are suggests that would improve the clarity of the claims:

Claim 22 recites that an insert of the first material is provided in the second part to receive a passage from the first part, "or vice versa." It is apparent that "vice versa" means

that "an insert of the second material is provided in the first part to receive a passage from the second material." However, it would be better to use this language rather than the language "vice versa."

Claim 52 uses parenthesis to clarify that the underside of the first part is the non-molding surface. Parenthesis are usually only used in claims to denote drawing reference numerals. Therefore, it would be better not to use parenthesis in clarifying the underside is the non-molding surface.

Claim 64 recites "these materials." It is apparent from the claim and specification that "these materials" is referring to the "steel, graphite, or ceramic" recited in claim 63. However, for clarity, it would be better to more specifically point out that "these materials" are the materials recited in claim 63.

Claim 68 recites that the channels have "a width and depth of between 2 and 10mm." It is apparent that this means that the width of the channels can be between 2 and 10mm, and that the depth of the channels can be between 2 and 10mm. However, to avoid possible confusion it would be better to more precisely point out the dimensions of the width and depth each specifically.

Claim 83 recites, "the layer is between 1 and 8mm." It is apparent from the disclosure of the application that this is

referring to the "uniform thickness layer" recited in claim 82, from which claim 83 depends. It would be better however to use the language "uniform thickness layer," as opposed to "the layer" in claim 83.

Claim 89 recites that the second part is located "prior to pressing." As the pressing step has not previously been recited in this claim or the claims from which it depends, it would be better to recite "a pressing operation" or something similar in this claim.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 23-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 recites that the mold is comprised of a number of cooperable parts, and that each part is "according to the invention." There is no antecedent basis for "the invention." Moreover, it does not make sense to refer to the invention of

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the application generally, as the invention encompasses many different things, any which may be related to some of the parts, but not others. Accordingly, the scope of the claim is incomprehensible and indefinite.

The term "relatively large surface area" in claim 31 is a relative term which renders the claim indefinite. The term "relatively large surface area" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Note, this limitation is unlike other similar limitations in the claims such as the third part recited as being a "relatively thin layer" in claim 1. In that case, the specification provides a standard for determining what "relatively thin" means (see p. 2, ll. 17-20). However, in the case of "relatively large surface area," no reference standard is provided.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-6, 13-15, 19-21, 23-24, 29-31, 35-37, 43-47, 52-54, and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 742 094 A1 (previously of record; hereinafter "EP '094").

EP '094 discloses a molding apparatus, and method for constructing the apparatus. As taught in the embodiment shown in figure 4, the apparatus comprises a first part (10) made of a first material and forming a surface of the mold (figure 4); a second part (1) made of a second material; and a third part (11) made of a third material. The third part is interposed between the first and second parts, and is a relatively thin layer (see figure 1). EP '094 discloses that the second material to be aluminum and the first material to steel (col. 7, ll. 43-46), and thus the second material to have a high thermal conductivity that is significantly greater than that of the first material (see col. 4, ll. 36-42). EP '094 also discloses the third material to be as such to form metallic bonds between the first material and third material, as well as the second material and third material (col. 7, ll. 43-46). EP '094 further discloses that the steel used for the first material can be maraging steel (col. 4, ll. 43-51).

The apparatus of EP '094 is also provided with passages (5) to permit cooling fluids to flow through the second material of

the apparatus. The apparatus also has holes extending through the first part (see figure 4) (note, the language of claim 19 only positively recites that the mold of the instant application be provided with holes extending through the first part, no language actually requires pins or slides).

EP '094 further describes the method of manufacture of the mold as providing a composite blank (col. 5, l. 6 - col. 6, l. 26) and then machining to produce the mold (col. 6, ll. 27-37).

8. Claims 1-3, 8, 11, 13-15, 19, 23-24, 29, 31, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Maus (U.S. Pat. No. 4,793,593; previously of record).

Maus discloses a molding apparatus. The mold comprises a first part (1) made of a first material. A second part (3) of a second material is provided, along with a third part (2). The first part thus provides a generally constant thickness layer for the molding surface (see figures 1 and 2A). Maus discloses the second material to be beryllium copper with a high thermal conductivity (col. 5, l. 57 - col. 6, l. 66), which would inherently have a higher thermal conductivity than the titanium nitride used for the first material (col. 8, ll. 59-69). Maus notes that the third material can be nickel film (col. 7, ll.



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38-69 and col. 8, ll. 59-69). Maus also discloses the mold to be provided with cooling passages (21).

9. Claims 61 and 63-64 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 97/40777 (hereinafter "WO '777").

WO '777 discloses a method of forming a mold. The method comprises forming a part of the mold which provides the mold surface by hot isostatic pressing a powder (6) against a former (4). The former is machined from steel (p. 2, ll. 18-19).

10. Claim 62 is rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 711 615 (previously of record; hereinafter "EP '615"; see also the abstract and machine translation of this document made of record in this action).

EP '615 discloses a method of forming a mold. The method comprises forming part of the mold by uniaxial pressing a powder (26) against a former (16).

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

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the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

14. Claims 8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '094.

EP '094 discloses the molding apparatus as described above. In particular, as noted above, the embodiment in figure 4 of EP '094 shows a molding apparatus to comprise first, second, and third materials. EP '094 specifies in this embodiment that the second material (1) be aluminum (col. 7, l. 43). However, EP '094 also notes that the second material used in the construction of the molds could be copper or an alloy of copper (col. 4, ll. 40-42). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have modified the apparatus shown in figure 4 of EP '094 as such to have used copper or an alloy of copper for the second material instead of aluminum because EP '094 discloses that copper and copper materials are also suitable metals for the second material.

Similarly, EP '094 specifies for the embodiment shown in figure 4 the third material to be titanium. However, EP '094 notes that nickel could also be used to bond metal layers together (col. 5, ll. 12-16). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have modified the apparatus of EP '094 as such to have used nickel as an alternative for the titanium

third material in the embodiment of figure 4 because EP '094 notes that nickel can function equivalently to titanium.

15. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maus.

Maus discloses the mold as described above. Maus does not disclose the third material coating to be substantially 25  $\mu\text{m}$ . However, Maus discloses the optimization of the coating thickness in order to make an optimal structure for the desired use of the mold (see for example, col. 8, ll. 37-58). Accordingly, it would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have optimized the coating thickness, including using a thickness of 25  $\mu\text{m}$ , because this would allow for an optimal mold structure to be produced depending the desired intended use of the mold as suggested by Maus.

16. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over EP '094 in view of Colvin et al. (U.S. Pat. No. 5,443,111).

EP '094 discloses the apparatus as described above, including the use of types of steel for the first material of

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the first part (col. 4, ll. 43-51). EP '094 does not disclose the steel to be H13.

Colvin discloses that H13 is known steel suitable for the construction of molding apparatus (col. 3, ll. 38-49).

It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have used H13 as the first material in the apparatus of EP '094 because H13 was a known steel suitable for construction of parts of a molding apparatus as suggested by Colvin.

17. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '094 as applied to claim 8 above, and further in view of Golz (U.S. Pat. No. 4,733,849).

EP '094 discloses and suggests the apparatus as described above, including the use of copper or a copper alloy as the second material. EP '094 does not specify the thermal conductivity of the copper.

Golz discloses that coppers with a thermal conductivity of 384 W/m°C are known to be useful in molding apparatus because of their thermal conductive properties (col. 2, ll. 57-60).

It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have modified the apparatus of have used a copper alloy with a thermal

conductivity of greater than 100 W/m°C because such coppers are known for being useful for their thermal conductive properties as suggested by Golz. Note such a modification of the apparatus of EP '094 amounts to optimize the particular properties of the apparatus, specifically the thermal conductivity of the materials with which the apparatus is constructed, in order to achieve a desired heat flow during molding. Optimization modifications are generally seen as obvious to ordinary artisans. In re Boesch, 617 F.2d 272, 203 USPQ 215 (CCPA 1980); In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955).

18. Claims 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '094 in view of Weiss et al. (U.S. Pat. No. 5,189,781; previously of record).

EP '094 discloses the molding apparatus as described above, including providing of cooling channels (5) in the second part (1). EP '094 does not disclose providing insert members in the second part.

Weiss discloses a molding die and method of manufacture of the die. Weiss notes that tubing (59) can be used in the die manufacturing process to aid in the formation of cooling channels (col. 5, ll. 34-36).

It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have modified the mold of EP '094 to have used tubing in the second part, and thus have inserts in the second part, because tubing aids in the formation of cooling channels as suggested by Weiss.

19. Claims 38-42 and 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '094 in view of WO '777.

EP '094 discloses the apparatus as described above. EP '094 further discloses the apparatus can be constructed by a method using pressure bonding techniques (col. 5, ll. 6-16). EP '094 does not specify a hot isostatic pressing method for constructing the mold.

WO '777 discloses a method for the construction of molding apparatus. The method uses hot isostatic pressing powder (6) against a former (5) to make the molds in an evacuated sealed container (8) at 15000 PSI (which is equivalent to 1034 bar) and 2175 °C (p. 3, ll. 4-15). WO '777 finds the process to be quicker and less time consuming than other mold making methods (p. 1, l. 11 - p. 2, l. 5).

It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to have used hot isostatic pressing in an evacuated sealed container at 1034 bar

and 2175 °C to produce the mold of EP '094 because such a process is quicker and labor intensive than other methods as suggested by WO '777.

20. Claims 65-90 are allowed.

21. Claims 12, 22, 48-51, 55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. Claims 25, 27-28, and 32-34 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to teach or suggest a mold with the combination of features recited in claims 12, 22, 25, 27-28, 32, or 65. The prior art of record also does not teach or suggest a mold and method for making a mold with the combination of features recited in claims 48-49, or 55.



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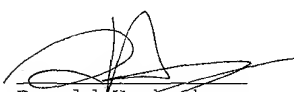
The closest prior art with respect to claim 12, 22, 25, and 48-49 claims is EP '094 and Maus. Neither EP '094 nor Maus teaches or suggests the second part to be in the form of inserts located in recesses of the first mold part as recited in mold of claim 12 and the method of constructing the mold of claim 48. Nor do the references teach or suggest an insert of the first material provided in the second part to receive a passage from the first part, or vice versa as recited in claim 22. Nor do the references teach or suggest the first part to be made in different sections of different grades of material as recited in claim 25, or to provide formations to increase surface area on the facing parts of the first and second material as recited in claim 32. EP '094 and Maus also do not teach or suggest insert members to be provided in the second part wherein the insert members are of a lower thermal expansion than the second material, or where the insert members are of the first material as recited in claims 27-28. EP '094 and Maus also do not disclose a method of making a mold wherein the second part is in the form of sheets locatable in cavities of the first part as recited in claim 49, or a method of making a mold with the second part being formed by locating the second material in powder form on the first part with the third part already thereon as recited in claim 55.

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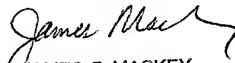
The closest prior with respect to claim 65 is Maus. Maus disclose an apparatus of three parts with cooling channels as described above. Maus fails to teach or suggest the cooling channels to be provided in the upper surface of the base (second) part, and none of the prior art of record suggests how such an arrangement could be integrated into a mold of the configuration disclosed by Maus.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donald Heckenberg whose telephone number is (703) 308-6371. The examiner can normally be reached on Monday through Friday from 9:30 A.M. to 6:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker, can be reached at (703) 308-0457. The official fax phone number for the organization where this application or proceeding is assigned is (703) 972-9306. The unofficial fax phone number is (703) 305-3602.



Donald Heckenberg  
November 25, 2003



JAMES P. MACKEY  
PRIMARY EXAMINER

11/25/03